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FEBRUARY 25, 1950

SCIENCE NEWS LETTER

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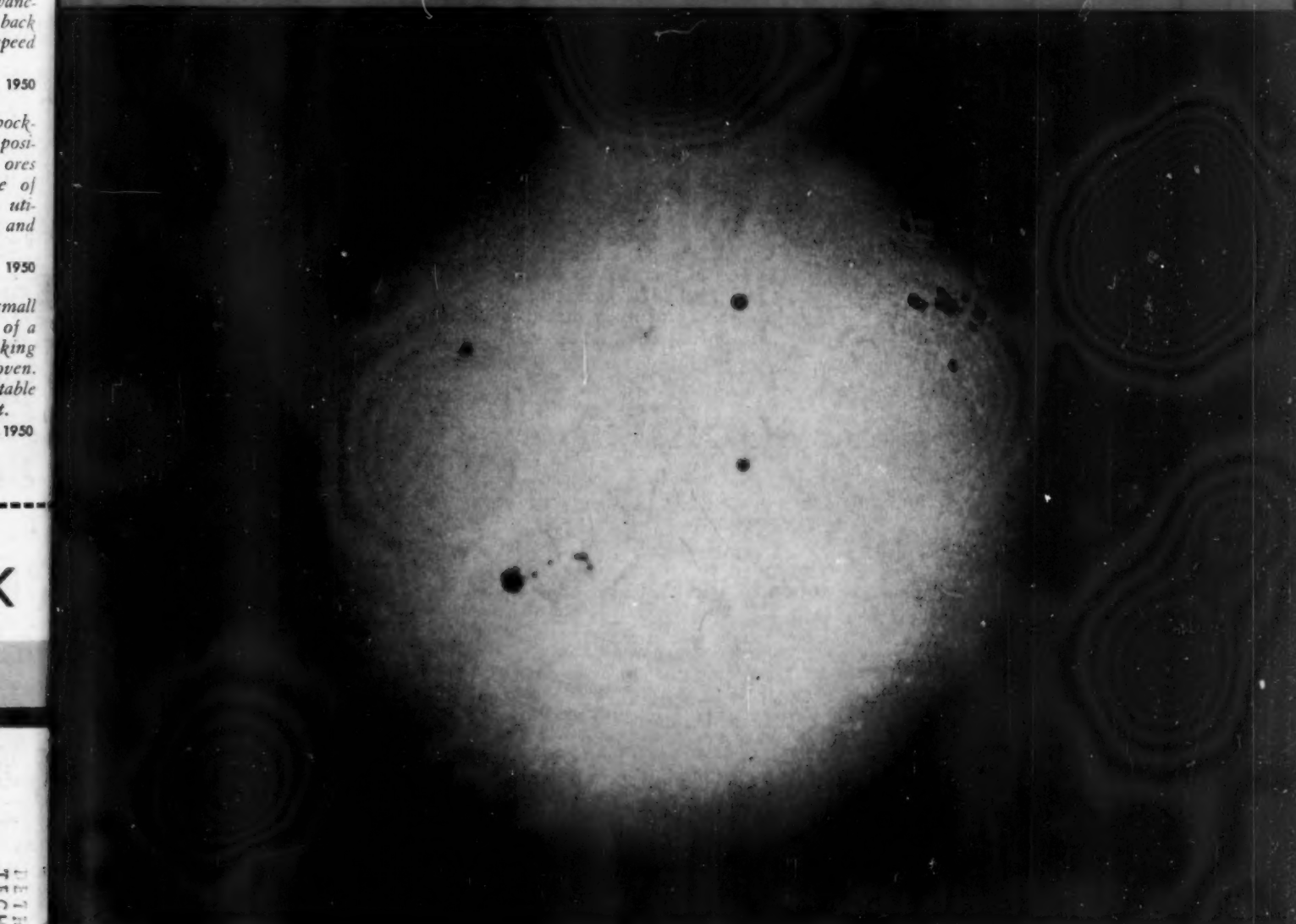

Disrupting Sun Spots

See Page 114

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VOL. 57 NO. 8 PAGES 113-128

NUCLEAR PHYSICS

Hindrance to H-Bomb

The nation's top nuclear physicists are at work at universities rather than on H-bomb. This will be a serious drawback in development of the bomb.

By DR. R. E. LAPP

➤ HARDLY any of the nation's top nuclear physicists are working on the H-bomb. This is a fact which might well slow down development of the new weapon. During the war, the employee roster of the Manhattan District—which developed the A-bomb—read like a Who's Who of the world's best brains in physics. Now you will find those brains scattered all over the country, most of them being applied to basic research in nuclear physics and cosmic rays.

At the University of Chicago, Cornell, M. I. T., Columbia, California Institute of Technology and the University of California are these men who made the A-bomb possible. Most of them would express great reluctance at the prospect of working for the Atomic Energy Commission on another bomb.

Some of the top men of the old Manhattan District who are not connected with the H-bomb project are Enrico Fermi, now at the University of Chicago; two Nobel prize winners, Arthur Compton and Harold Urey; Hans Bethe and Philip Morrison, now both at Cornell; Jerrold Zacharias, now head of M. I. T.'s Institute of Nuclear Physics, and John Archibald Wheeler, at Princeton.

Thus, it may well turn out that the H-bomb development—at least in this country—will be a lengthy one. It would be surprising indeed, if the true superbomb, one with the punch of one million tons of T.N.T., were developed in a few years.

Meanwhile, the military men are looking over possible targets for the H-bomb. Since one with a million-ton punch would scorch an area of from 200 to 400 square miles, it would not be economically feasible to use it on a target smaller than this.

Science News Letter, February 25, 1950

MEDICINE

Ivy Shots Disappoint

➤ NINETY cadets at the U. S. Military Academy, West Point, N. Y., and their physician, Dr. Robert J. Hoagland, chief of the medical service at the station hospital, have found that "shots" intended to protect against poison ivy are not worth taking.

The anti-poison ivy shots were given to three groups of men. Two of the groups spent the summer at Camp Buckner, an area that abounds in poison ivy and in which cadets get ivy poisoning each year. The 33 cadets in the first group all had had ivy poisoning the previous summer and had been under Dr. Hoagland's care. Of these, 21 received inoculations during April and 12 were used as controls. Of the controls, 83.4% developed ivy poisoning, and so did 66.6% of those who got the inoculations.

Half of the second group of 36, all of whom were inoculated, also got poisoning. So did almost a fourth, 24%, of the third group who were inoculated before spending the summer on leave, on duty at West Point, at Camp Buckner and on various trips.

Although there was a difference between the inoculated and the untreated men in the first group, Dr. Hoagland stresses the fact that over half the inoculated were affected by poison ivy.

"A physician should be able to extend far better prospects to a patient receiving painful inoculations," he states in THE NEW ENGLAND MEDICAL JOURNAL (Jan. 26).

Previously favorable reports on inoculations against poison ivy are based, in his opinion, on too few persons in the control group or the fact that the inoculated persons were not exposed enough to the poison ivy plant. On this point he cites the work of another group of physicians who, "encouraged by apparently 100% successful inoculation of 40 boys, proceeded to hand six of them poison ivy leaves which were held for only 30 seconds." Ivy poisoning promptly developed in five of the six and was so severe they had to go to the hospital. The only one unaffected was the only boy who had not had ivy poisoning before.

Science News Letter, February 18, 1950

ASTRONOMY

Sun Spot Area Causes Short Wave Radio Blackout

See Front Cover

➤ A GIANT sun spot area, biggest of the year, caused serious disruption of short wave radio communication Feb. 20-22.

An unusual number of spots were visible on the sun, as is illustrated on the front cover of this week's SCIENCE NEWS LETTER. The large group of seven spots in the upper right hand corner of the sun is the area causing major disturbances of short wave radio communication.

The giant sun spot area first appeared on the northeast limb of the sun on Feb. 13. It traveled toward the center meridian and crossed it about midnight Sunday, Feb. 19.

When the sun spot group appeared there was an outburst of "solar noise," energy that the sun is radiating to us. Scientists hear this radiation with equipment that operates on very high frequencies, such as those used for FM, television and radar.

Another outburst of major solar noise occurred on Feb. 14 and 15, and still other bursts as the giant area traveled across the sun. These bursts were very intense, the major solar noise on Feb. 14 having lasted over half an hour. This is an unusually long period for a major burst to last.

Science News Letter, February 25, 1950

ENGINEERING

New Steel-Making Process Gives Open-Hearth Quality

➤ THE new so-called turbo-hearth process for making steel is capable of making open hearth-quality steel in 12 minutes without using external fuel. The American Institute of Mining and Metallurgical Engineers was told this in New York by C. E. Sims, Battelle Memorial Institute, Columbus, Ohio, and F. L. Toy of the Carnegie-Illinois steel company.

This fast steel-making process is largely a development made at the Battelle Institute with the support of Carnegie-Illinois. The researchers first made 32 1,000-pound heats of steel in a laboratory experiment at Battelle. Then commercial scale heats were made at Carnegie-Illinois in a 30-ton vessel loaned by Jones & Laughlin Steel Corporation.

In this process the steel is made without external fuel. The heat is provided from chemical reaction by burning the impurities in liquid iron with a blast of air. In the turbo-hearth the air is applied from the side, at the surface of the hot metal charge.

The development is considered especially important because it provides a steel-making method that is fast yet flexible. Oxygen can be added to the air if increased reaction speed is desired.

The vessel in which the process is carried out is the turbo-hearth. It is a partly closed chamber, shaped somewhat like a giant coffee-maker, built of heavy steel sections and lined with basic brick that can stand temperatures ranging higher than 3,000 degrees Fahrenheit.

Science News Letter, February 25, 1950

NUCLEAR PHYSICS

H-Bomb Is Russian Asset

An H-bomb attack could wipe out most U. S. cities, but it would have less effect on Russia's less centralized population. Moscow would be the only Russian target.

➤ IN case of H-bomb attacks on the U. S. we shall have to write off most of the big cities in the country. This is the opinion of Dr. Ralph E. Lapp, who worked on the atom bomb during the war and who since has headed the Nuclear Physics Branch of the Office of Naval Research.

"Horrible as it may sound," he said, "we must be prepared to lose 10 to 15,000,000 people in the first day of the superblitz."

Because of the many American cities with large concentrations of population in contrast to the very few large centers of population in Russia, Dr. Lapp thinks that the H-bomb will be much more dangerous to us than to the Soviet Union.

An H-bomb is likely to produce a one-million ton equivalent TNT explosion, Dr. Lapp figures. "If we look in Russia for targets compatible with a one-million ton explosion we find that only one city qualifies. That is Moscow."

On all other Russian targets, Dr. Lapp said, "it might be more feasible to use the explosive force of an improved A-bomb.

"Even a casual inspection of American cities," Dr. Lapp pointed out, "reveals that we have far more compatible targets than Russia. In a certain sense we are rather like the man who lives in a tar paper shack and develops a flame thrower to protect himself."

Dr. Lapp noted that close to 20,000,000 people live in New York, Chicago, Philadelphia, Detroit and Los Angeles. "There is very little we can do about those cities, except to stop them from getting any worse."

As for Washington, Dr. Lapp declared that "no one will ever be able to convince industry that it should disperse or civilians that they should limit the size of the cities, if nothing is done about the overcentralization of government agencies."

He recommended as a first step that the Navy move out of Washington and that many branches of the Army and Air Force move out of the Pentagon. "The Pentagon should be drastically cleaned out. The space can be used for dead records.

"Most importantly," he went on, "we must avoid the concentration of key individuals in one locality. For example, I would think it entirely proper that the Senate meet in Alexandria, Va., and the House in Bethesda, Md."

Calling for more information on the government's atomic policies, Dr. Lapp said, "What we need now is a prospectus on the H-bomb. With the simple facts about H-bomb effects, we can proceed to see how the use of the H-bomb against us forces us to modify our civilian life."

Dr. Lapp figures that an H-bomb will weigh about 25 tons and, consequently, will be extremely hard to deliver over the target. When it gets there, however, "certainly the detonation of such a superbomb would be an awesome spectacle. The H-explosion would form a miniature sun glowing brilliantly in a searing flash of heat. At the moment of explosion there would be a flash of very penetrating nuclear radiation, but this would die out quickly and there would be little prolonged radioactivity."

Figuring that the strength of the explosion would equal one million tons of TNT, Dr. Lapp said that 100 square miles would be damaged and the area seared by the heat rays would range from 200 to 400 square miles.

"The heat effect from the H-bomb will be the most enhanced property of the weapon," he declared. He expects that the bomb will be exploded from a height of four miles above ground zero.

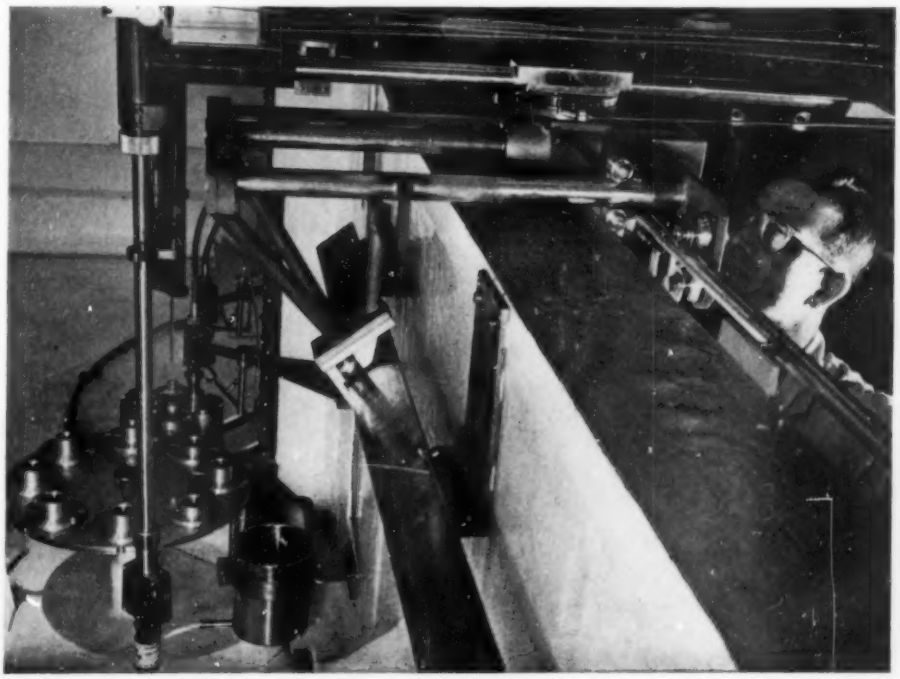
Science News Letter, February 25, 1950

NUCLEAR PHYSICS

Improve Isotope Shipping

➤ MORE than 700 research projects using radioisotopes to promote health and cut industrial waste in the United States and 21 other countries are expected to profit from improved isotope shipping facilities just opened at the Oak Ridge National Laboratory.

New buildings where dangerously radioactive fission products from the atomic pile can be stored behind adequate shielding walls and handled with production-line methods by remote control have been put into service by the Carbide and Carbon Chemicals Division of the Union Carbide and Carbon Corporation, operating the plant for Atomic Energy Commission. At the same time the Commission announced



HANDLED WITH CARE—Remotely controlled complex equipment is used in handling radioisotopes for shipment from Oak Ridge National Laboratory. The packing tongs shown are transferring a shipping bottle from the area of bottle-decapping, pipetting and sealing toward the barricade section (not shown) where the shipment is measured for radiation level and deposited inside the shipping container.

that the prices of isotopes which result from uranium fission will be reduced after March 1, and that these radioactive materials will be available in increased quantities.

Mirrors and periscopes in the new packing area allow the men who handle radioactive fission products to see the bottles they pick up. They work with long-distance tongs manipulated by means of levers and steering wheels. With these a measured quantity of radioactive liquid can be taken out of a stock bottle and transferred to the bottle in which it is to be shipped. Caps can be screwed back on the bottles, the measuring pipette washed, the stock bottle returned to its numbered place and the smaller bottle placed in its shielded shipping container, all by a man separated from the glassware he is handling by a two-foot-thick concrete wall.

Priced according to its rating in millicuries of radioactivity, a radioisotope is shipped usually in hydrochloric acid solution, looking like a small medicine bottle full of water. No hint of the powerful rays emanating from this harmless-looking solution reaches the senses, but Geiger counters and other detecting apparatus, mostly of Oak Ridge manufacture, monitor every outgoing package. Packing material to shut out radiation, and also to soak up the liquid in case the glass should break, surrounds the bottle if the contents are not too dangerous. The whole package is then canned in a commercial tin can of the size often used for tomato juice.

More violently radioactive materials require foot-thick walls of lead to prevent their dangerous rays from leaking through. A few hundredths of a gram of active material may have a shipping weight of many pounds by the time its protective containers are assembled.

Research on cancer is carried on by means of two especially important isotopes from the Oak Ridge atomic pile. Iodine 131, which concentrates in the thyroid gland, and phosphorus 32, which is picked up by bone marrow and other specialized tissues, are in the greatest demand by research groups. Phosphorus 32 has a long life and may be stockpiled for a considerable time, but isotope production at the atomic pile is geared to the short half-life of the iodine isotope. Taken from the reactor on Monday, it is stored long enough for accompanying unwanted radiation to die away, then packaged, and on Friday of each week loaded on the plane for delivery to research centers where it will take up its experimental role the following week.

Science News Letter, February 25, 1950

MEDICINE

Hamster May Be Weapon In Attack on Kidney Tumor

➤ HOPE for a better attack on a deadly kidney tumor that kills many children comes from a discovery reported by Drs. Hadley Kirkman and R. L. Bacon of Stanford University.

This tumor is known as Wilms tumor. The Stanford scientists have been able to produce tumors that may be the same as Wilms tumors in male hamsters. If the hamster tumors are the same, it will give scientists laboratory material for experiments on the cause and possible prevention or remedy for such tumors in children.

The kidney tumors in the hamsters were produced by injections of female sex hormone, diethylstilbestrol, in large doses over about half the life-time of the guinea-pig-like animals. This is believed the first time a kidney tumor has been produced by the use of sex hormones. The scientists point out that this hormone does not produce tumors in other kinds of laboratory animals and is in fact used successfully as a weapon against cancer of the prostate gland in men.

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Question Box

ASTRONOMY

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GENERAL SCIENCE

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NUCLEAR PHYSICS

Why is the hydrogen bomb a Russian asset? p. 115.

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PHYSICS

How does heated polonium react? p. 126.

VETERINARY MEDICINE

What are the drugs being used against mastitis? p. 124.

Photographs: Cover, U. S. Naval Observatory; p. 115, Atomic Energy Commission; p. 117, Ira Rosenberg, New York Herald Tribune; p. 118, Army Engineering Laboratory, Fort Belvoir; p. 119, Eastman Kodak Company.

● RADIO

Saturday, March 4, 3:15-3:30 p.m. EST

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Earl J. McGrath, Commissioner of Education, Office of Education, Federal Security Agency, will talk on "Science in Education." The young scientists attending the Science Talent Institute will ask questions of Commissioner McGrath.

By mixing *powdered casein* from milk with water glass, sodium silicate, a strong adhesive may be formed.

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GENERAL SCIENCE

Projects of STS Winners

Future research scientists, winners in the Ninth Annual Science Talent Search, reveal results of their scientific experiments.

➤ SOME of the scientists of tomorrow will gather in Washington, D. C., March 2 through 6, for the Ninth Annual Science Talent Institute. They will bring with them the results of their favorite hobbies and pet projects for an evening of checking on each other's progress before an audience of several thousand invited guests.

Some of the projects they will display were also subjects for the 1000-word essays which the contestants wrote. The essay was one of the requirements of the competition (See SNL Feb. 11, 1950). Summaries of some of the essays of the 40 winners follow:

Two of Triplets Study Nature

The first two of triplets to win in the nine years of the Science Talent Search, are girls who live in Forest Hills, N.Y. Both study living things, but one turns to ants and the other to birds. The third sister is not scientifically inclined and did not compete in the Ninth Annual Science Talent Search.

An ant named E-1 has finally learned that the shortest path is the quickest way to dinner, thanks to the patience of 17-year-old Cynthia Jackson.

Working with complicated mazes in which there were three zig-zag pathways of increasing complexity, Cynthia put E-1 through 45 trial runs before he finally caught on. During the last four trips he ignored the two roundabout routes and made an unerring beeline for the shortest path. All three routes led to the feed box where he got his reward.

This was part of a maze-learning experiment which Cynthia conducted on her own in the animal behavior department of the American Museum of Natural History in New York City. Cynthia, a senior at the High School of Music and Art in Manhattan, found that ants show varying skill in mastering the problem. E-1 was one of her brighter pupils.

Patricia Jackson, Cynthia's sister, turned her scientific interest to a different segment of the natural world. In studying the relationship between birds and their environment, Patricia staked out 25 acres of undisturbed upland woodland near Roslyn, N.Y.

Within this area she observed 18 different species which had chosen the locality to build their nests. These included oven birds, scarlet tanagers, blue jays, chickadees, and red-shouldered hawks. In all she counted 99 nesting pairs.

She came to a preliminary conclusion that the large proportion of insect-eating birds coincided with the presence of abundant insects, while the absence of seed-eating birds apparently coincided with a lack of suitable food. Patricia hopes, however, to make further studies to see what other factors, like water supply and available nesting sites, affect the bird population.

Patricia, first in the senior class at Hunter College High School in New York hopes to become a biologist too.

Helium Energy Measured

By very careful measurement of the tracks made by helium atoms across a photographic plate, Saul Sternberg, 16-year-old New York high school senior, has calculated the energy released by cyclotron bombardment of one of the non-fissionable elements.

The helium was produced when the element boron was bombarded with neutrons. To get this effect he used photographic plates impregnated with boron. These he persuaded Washington University, in St. Louis, to bombard with neutrons in their cyclotron.

He measured 500 helium tracks and averaged them. Then he computed mathematically the energy the helium atoms are expected to have, using the famous Einstein equation: $E=mc^2$.

Mr. Sternberg is a senior at the High School of Music and Art, New York. He has other interests besides physics. He has designed and built several electronic devices, including an audio-frequency amplifier, an electronic metronome, and an electric page-turner for musical scores. His career choice is theoretical physics.

Control for Potato Beetle

A mixture of Paris green, lead arsenate, and lime gives the best control over adult Colorado potato beetles, is the conclusion of John Rippon, 17-year-old Sylvania (Ohio) high school senior, after studying the effect of nine different insect preparations.

The Colorado potato beetle is a serious agricultural pest, and Mr. Rippon set about discovering the best way to control it. He took a strip of land 50 by 15 feet and divided it into 10 equal patches. On one patch he studied the life history of the beetle and on the other nine he tested the effect of various insecticides.

He found that chemical control is most effective during the larval and adult stages. A mixture of pyrethrum and sesame oil paralyzed larvae but had little effect on adult beetles, while cryolite proved ineffective on both larvae and adults.

Paris green, when used alone, proved

TWO OUT OF THREE—Phyllis Jackson, one of the triplets, center, pins flowers on her sister, Patricia, left, and Cynthia, after they were chosen among the forty top winners in the Science Talent Search. Although both of the winners are students of nature, Phyllis' chosen field is sociology.

detrimental to the potato plants themselves. When mixed with lead arsenate and lime, however, the preparation had no damaging effects on the plant, and it gave very good results against the beetles.

Mr. Rippon is president of the physics and chemistry clubs at Burnham High School. He hopes to go to the University of Michigan to prepare for a career as a parasitologist.

Tick-Tack-Toe Machine

Noel Elliott, 18, has designed and built an electronic machine that plays tick-tack-toe.

The human player gets the first move and the machine counters with a scientifically calculated move. These were set after the young designer had studied thousands of possible moves.

The machine, using a simplified version of the principles on which the large electronic computers are based, is not designed to win. Chances for man vs. robot are even but whenever its obstructive move goes into a winning square the machine is the victor.

Although tick-tack-toe is a very simple game, it was no simple matter to design a machine which would make all the correct moves. There are 362,882 possible games, and the circuits had to be so designed that the machine gives the correct reply in any situation.

The machine's moves are signaled by a light after the man has made his move by throwing a switch.

This device is not the first original machine Mr. Elliott has to his credit. The Kellogg, Idaho senior, who plans a career in electronics, has been building various kinds of machines since age 13.

(*To be continued next week*)

Science News Letter, February 25, 1950

CHEMISTRY

New Fire Extinguishing Chemical Gives Promise

➤ A NEW fire-extinguishing chemical under test at Fort Belvoir, Va., by Army engineers gives promise of being more effective than those generally used. It is a chemical of the bromo-fluorocarbon group.

Tests already made indicate that several compounds of the bromo-fluorocarbon group easily put out gasoline and electrical fires against which identical quantities of carbon dioxide or carbon tetrachloride were not effective.

The initial laboratory work on these compounds in fire-extinguishing was carried on at Purdue University, Lafayette, Ind. Tests are to verify laboratory data and to screen the candidate compounds. The final selection will have to be one that is not poisonous because the new agent will be used to fight fires in vehicles and other confined locations. Preliminary work indicates that several of them are not toxic.

The fluorocarbons constitute a relatively new family of organic chemical compounds. They are similar to the hydrocarbons of petroleum but differ in that the hydrogen is replaced by fluorine. Bromo-fluorocarbons contain both bromine and fluorine.

Science News Letter, February 25, 1950

ASTRONOMY

Northern and Republican Irish Share Telescope

➤ NORTHERN Ireland and the Irish republic do not always see eye-to-eye but they are both part owners now of a new eyeglass that will soon be peering at the "hub of the universe" from the Harvard Observatory station in South Africa.

The new Baker-Schmidt type of telescope with the world's largest (33 inch) prism was accepted from Perkin-Elmer Corporation, Glenbrook, Conn., by Dr. Harlow Shapley, director, and Dr. Bart J. Bok, expedition leader, who will use it to explore the Milky Way more thoroughly than ever before.

Stars a hundred thousandth of the brightness of the faintest star visible to the naked eye will be captured photographically in 20 minutes with the new ADH telescope (A for Armagh Observatory, Northern Ireland, D for Dunsink in Eire, and H for Harvard.)

The program of Harvard astronomers using the new telescope is the first step in a five-year program to map and discover the center of the universe.

Science News Letter, February 25, 1950

ENGINEERING

Narrow Strips of Soils Test New Mine Detectors

➤ NARROW parallel strips of different types of soil are used in testing new mine detectors at the Army Engineer Research and Development Laboratories, Ft. Belvoir, Va., it is now revealed. The objective is detectors that will be usable on all types of soil.

Mine detectors may react differently with different soils. Most of the detectors are electric devices that are swept over the path of an advancing army to locate buried mines that explode when trodden upon. The detector sets up an electric field and this field is affected by any magnetic material over which it passes.

The most common mines are in an iron or steel container. When passed over by the detector, the electric field is altered enough to send a warning signal to the earphones of the operator. The detector, however, has little value if the soil contains iron ores, particularly magnetite, found in volcanic regions.

The narrow, side by side testing lanes of soil used contain many kinds of soil. They represent all the soils of the world, at least in type. They contain sand, clay, gravel, sandy loam, and many other soils. Mines, test disks and test blocks are buried in them at given depths.

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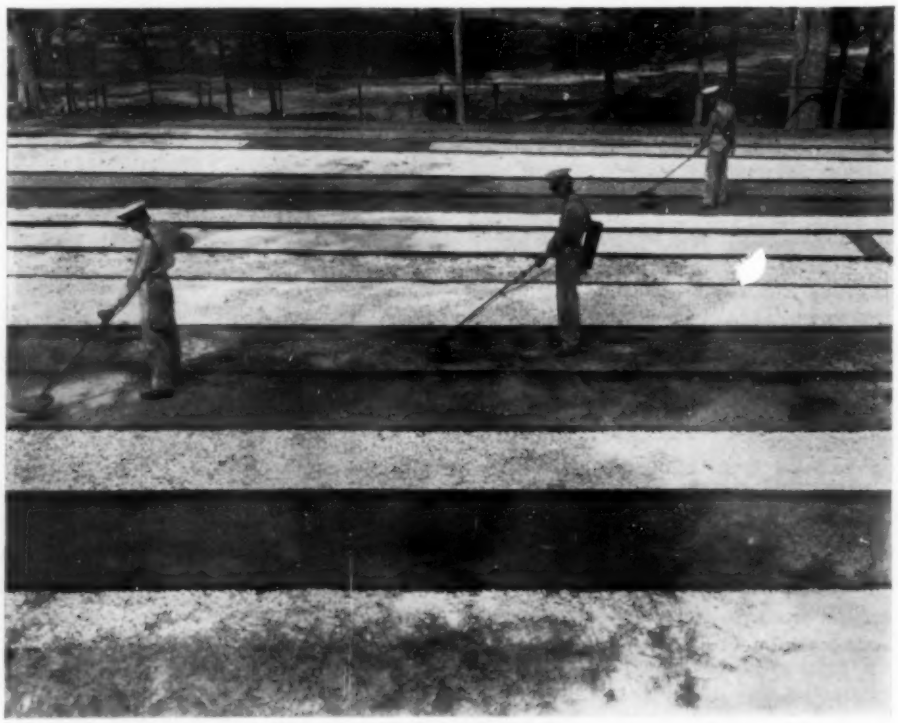


VERSATILE DETECTORS—New mine detectors are tested on narrow parallel strips of different types of soil. The aim is the perfection of a detector usable on different types of soil.

GENERAL SCIENCE

Theories Denounced

Velikovsky's theories attempting to correlate astronomical and other scientific phenomena with Biblical happenings is denounced as "apologetic procedure".

➤ USING such phrases as "nonsense and rubbish", top astronomers, geologists, historians, archaeologists and theologians denounced statements by Dr. Immanuel Velikovsky to the effect that in 1500 B.C., the world stopped revolving for a few days and that this happened because the planet Venus was at that time a comet which passed very close to the earth.

Dr. Velikovsky's statements appear in Collier's (Feb. 25), have also appeared in Harper's (Jan.) and will be published in several volumes by Macmillan. The magazine articles were taken from the first of these books, to be published in a few weeks, called WORLDS IN COLLISION.

Quoting copiously from the Bible and other ancient records, Dr. Velikovsky claims that at the time of the Exodus of the Jews from Egypt, the earth passed through the "comet" Venus' tail, that this caused not only the Red Sea to open up for the Israelites but also mountainous tides which swept over all of the continents. "The presence of a celestial body near by," he says in Collier's "caused the earth to form new mountains, to open volcanoes and also to let lava flow from fissures in the ground."

To this, Dr. David Delo, executive director of the American Geological Institute, said that the world's mountains were formed millions of years ago, that it took them hundreds of thousands of years, not a few days, to form and that they would look entirely different if they were formed by such an upheaval as Dr. Velikovsky describes.

"He appears to be bypassing all the sound, scientific observations of a multitude of geologists made during the past 100 years," said Dr. Delo.

Although most men of learning, when informed that Dr. Velikovsky's work is actually to be published in several volumes, appear to be amazed, it is the astronomers who express their thoughts most definitely.

Dr. Harlow Shapley, director of the Harvard Observatory, who said that he was speaking for his fellow astronomers, called Dr. Velikovsky's theory that Venus, in the guise of a comet, had made the earth stand still for a few days, "rubbish and nonsense."

He pointed out that there are written records of the observation of the planet Venus 500 to 1,000 years before the Exodus, that Venus has a mass approximately a million times greater than any comet.

Noted historian Carl Kraeling, director of the Oriental Institute of the University of Chicago, said that Dr. Velikovsky's work is "another example of the apologetic procedure which helps us not at all in our understanding of history." The apologetic procedure, he explained, is the method of taking a statement of alleged fact and then looking around for things to prove the statement true.

"When he cites Egyptian references to the sun standing still," Dr. Kraeling went on, "he shows he doesn't know about oriental imagination and poetry. Historians generally try to stick to the laws of probability in examining old records."

Dr. Kraeling concluded, "There is nothing we as historians can do about Dr. Velikovsky's work other than smile and go about our business."

Dr. Henry Field, anthropologist and archaeologist, who has studied the Near East area extensively, declared that it doesn't matter whether the waters of the Red Sea parted, the Israelites didn't cross that body of water in any case. It has been rather well proven, he said, that the Israelites crossed, instead, the Sea of Reeds. A strong wind, he said, could have created a path across this shallow body of water.

President Nelson Glueck of the Hebrew Union College, Cincinnati, declared that "Dr. Velikovsky can get absolutely nowhere by referring to biblical material because it lends itself to too many different kinds of interpretations." Dr. Velikovsky also refers to ancient Rabbinical writings, Dr. Glueck pointed out that most of these were written years after the events they describe.

"Although there is a historical basis for much that is in the Bible," said Dr. Glueck, "if you want to, you can prove almost anything by the Bible. I am disinclined to use obscure texts to prove a point which can only be proved by definite, concrete, physical evidence."

Science News Letter, February 25, 1950

GEOLOGY

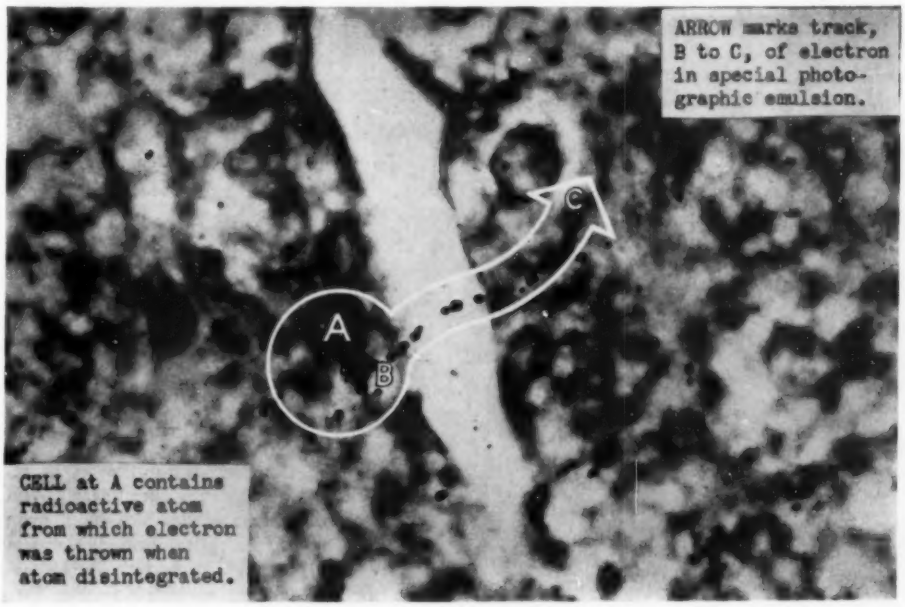
Japan Has 200 Volcanoes, Mount Azuma Is Active

➤ MOUNT Azuma in Japan is one of those seemingly quiet volcanoes that suddenly bursts into violent and possibly disastrous activity.

Japan is one of the most mountainous and geologically restless countries in the world. Many of its volcanoes are active or only recently extinct. Japan is an important part of the volcanic belt which encircles the Pacific Ocean.

On the various islands there are about 200 volcanoes. Of these 18 smoke all year round, and about 50 of them are considered more or less active.

Science News Letter, February 25, 1950


ARROW marks track, B to C, of electron in special photographic emulsion.
A
B
C
CELL at A contains radioactive atom from which electron was thrown when atom disintegrated.

***NEW ATOMIC TRACK**—The trail of the tiny nuclear particle known as a beta particle has been photographed for the first time as it speeds from a single radioactive cell in a rat's liver. The picture is magnified about 700 times. Such photography will enable scientists studying growth and deterioration of tissue to locate single body cells which have absorbed a radioactive isotope.*

MEDICINE

Nerve Operation Makes Polio-Shortened Leg Grow

➤ A CHILD'S polio-shortened leg may be stimulated to grow by a nerve-cutting operation, Drs. John A. Reidy, Thomas F. Broderick, Jr., and Joseph F. Barr of Boston reported at the meeting of the American Academy of Orthopaedic Surgeons.

The operation consists in removing a mass of nerve cells, called a ganglion, along the spinal cord on the side of the short leg. One result of such operation on the sympathetic nervous system is that the blood flow to the legs is increased strikingly.

Polio-shortened legs seem to have less blood supply than normal. Theoretically, therefore, the nerve-cutting operation should stimulate the growth of the short leg by increasing its supply of blood. Although there has not been much experimental work to support this theory, definite evidence of growth stimulation has been seen in patients who have had the operation.

Science News Letter, February 25, 1950

PHYSICS

Synthetic Quartz Crystal From German Process

➤ THE present successful process of making quartz crystals in the laboratory for use in radio and telephone applications was developed from a method in Germany found by postwar allied scientists, Dr. Albert C. Walker, Bell Telephone Laboratories, stated in Ithaca, N. Y.

Scientists tried to synthesize quartz over 100 years ago, he said. The purpose then was to learn more about the geological formation of the earth. In recent days the attempts to form quartz crystals in the laboratory have been to obtain a domestic supply for use in controlling radio transmission frequencies and in certain telephone applications.

Few crystals suitable for this purpose have ever been found in the United States. For the millions needed during the recent war, importation was necessary, although a few substitutes were developed.

Early synthesized quartz crystals were too small to be of practical use. From information secured in Germany in 1946, it appeared that Prof. R. Nacken at the University of Frankfort had grown quartz crystals in a few hours by a hydrothermal process, Dr. Walker stated. Unfortunately Prof. Nacken could make his process work for only short intervals of about 24 hours. To get large crystals, the process had to be repeated on a single crystal.

After nearly a year of research in the Bell Laboratories, the limitations of the German process were overcome. It is now possible to grow a quartz crystal weighing over one-quarter of a pound in a period of two weeks.

The value of the quartz crystal in radio and telephone applications is its piezoelectric property. Certain other crystals are piezoelectric but are either too costly or not satisfactory in such applications. Piezoelectric crystals, when subjected to mechanical pressure, give off electric charges; conversely, they can convert electrical energy into mechanical energy.

Science News Letter, February 25, 1950

ENTOMOLOGY

Plastic Film Seals Tobacco Warehouses

➤ TOBACCO men, forced frequently to fumigate warehouses to kill destructive insects that otherwise would damage the stored crop, are now using a plastic film on the warehouse walls to prevent fumigant gas from escaping.

More effective fumigation is the result. There is also a saving in fumigation cost because less of the insecticide is required. Vinylite plastic is used for the coating. It is the same material employed to protect military and naval equipment against weather and rust. It is applied as a spray. Skilled labor is not required.

A coating only five thousandths of an inch thick will prevent the fumigant gas from escaping from the warehouse, officials of Union Carbide and Carbon Corporation state. This company manufactures the preparation used. The spray solution dries to a tough film that is resistant to weather, flame and chemicals.

Science News Letter, February 25, 1950

ARCHAEOLOGY

Inca Language Gets Its First ABC's

➤ A NEW set of ABC's has been devised in Cuzco, Peru. It is for an ancient language that has been spoken for thousands of years but never written or spelled out until recently, so far as anyone knows now.

The language, Quechua, was the official language of the Incas 2,000 or more years ago and is still spoken every day by thousands of Indians in this and neighboring countries.

Books in Quechua have appeared in recent years, though they are rare. And they are confusing and hard to read, even for those who speak the language easily, because each author has had to devise his own method of putting the language into letters and words.

The new alphabet, worked out last year by writers in Quechua and experts in the spoken language, made its first appearance in the first issue of a new journal, TRACHCION, published in Peru.

Science News Letter, February 25, 1950

IN SCIENCE

MEDICINE

Chloromycetin Conquests Are Foreseen

➤ NEW triumphs for chloromycetin, one of the newer antibiotic drugs of the penicillin class, are foreseen by Dr. J. D. Gray, London pathologist.

"Future uses of this antibiotic in respiratory (breathing) tract infections seem almost limitless, if observations made on the upper respiratory tract can be extended to include the whole tract," he declared in a report to the medical journal, LANCET (Jan. 28).

Complete sterilization of the upper respiratory tract was achieved by the drug given by mouth. This sterilization, or freedom from germs, lasted two or three days after the last dose of the drug.

This property of the drug, he pointed out, "will enable the chest surgeons to work in a field as sterile as any purist could desire."

The cough and vomiting of whooping cough are stopped by the drug, Dr. Gray also reported, and the children recover more quickly.

Science News Letter, February 25, 1950

MEDICINE

Rare Skin Disease Yields To Aureomycin Treatment

➤ HOPE that pemphigus, rare but serious skin disease, may yield to one of the mold remedies, aureomycin, is suggested by Dr. F. Ray Bettley, dermatologist to the Middlesex Hospital, in a report to the LANCET (Jan. 14).

A patient who had been sick with this blistering skin condition for a month, who was hardly eating because of the sores in her mouth and for whom the prospects of recovery were poor, began to get better within 24 hours after aureomycin treatment was started. Her temperature started to go down, reaching normal on the third day. No more blisters developed, although ordinarily in this disease fresh ones develop sometimes before the last ones have healed.

The patient left the hospital apparently cured, about eight weeks after aureomycin treatment was started.

Pemphigus is characterized by periods in which the patient apparently recovers only to have a relapse. Dr. Bettley therefore points out that "it would be most rash" to claim that this patient's apparent recovery was the result of the aureomycin treatment. But the results were so good that he thinks further trial of this drug is warranted in other cases of pemphigus.

Science News Letter, February 25, 1950

NCE FIELDS

MEDICINE

New Cortisone Treatment Method Relieves Arthritis

➤ A NEW way of using cortisone to treat rheumatoid arthritis is giving "encouraging" results, the discoverer of the drug, Dr. Edward C. Kendall of the Mayo Clinic, reported to an American Chemical Society meeting in Chicago, Ill.

Time is an important factor in the treatment, recent research at the Mayo Clinic shows.

"If cortisone is given to a patient with rheumatoid arthritis for two weeks and use of it is then stopped, the symptoms return promptly and sometimes in an aggravated form," Dr. Kendall said.

"If cortisone is again administered for two weeks and stopped, the symptoms may return more slowly and in milder form. This type of treatment is now under investigation. The results have been encouraging."

The best method of using the drug for arthritis and rheumatic fever has not yet been worked out.

The "only avenue of supply which can furnish an unlimited amount of cortisone," is total synthesis from simple chemicals in the laboratory, Dr. Kendall declared. It may be months or perhaps even years before this is achieved.

At present it is partly synthesized starting with ox or sheep bile. The yield is so small, however, that 40 head of cattle are needed to provide the cortisone needed by one patient for one day.

Science News Letter, February 25, 1950

RADIO

One Camera, One Receiver Tube in Color TV System

➤ CHEAPER and better color television is promised with developments that utilize only one tube at the camera and one at the receiver, it was revealed recently.

The equipment was developed by a small company of San Francisco, financed by interested business men of the state. Color Television, Inc., is the name of the company. Arthur S. Matthews is its president. George E. Sleeper, Jr., inventor of the process, is vice president.

The system is an all-electronic method. In transmission, standard black-and-white equipment is used with some modifications and additions. At the camera, three color filters are used with a special optical system. Three optical images are focused side by side and scanned as though they were a single black-and-white image. The signals generated are transmitted in a normal manner through standard black-and-white equipment.

At the receiver, superimposing lenses are employed to register three images, each fluorescing in a different primary color (red, green, blue) from the end of a single cathode-ray projection tube to a projection screen.

The single tube projection receiver utilized by Color Television, Inc., is satisfactory today and provides a picture of high quality color balance and adequate brilliance, Mr. Matthews declared.

A direct view color tube is a foreseeable early development, he added. Its addition can be made without any change in the standards of FCC, the federal governing agency in radio and television transmissions.

The two most important and essential features of the Color Television, Inc., method are the utilization of present black-and-white equipment and the fact that present 6-megacycle black-and-white channels may be used for the transmission of color as well as black-and-white.

Owners of black-and-white receivers will be able to pick up color transmission in black-and-white, but not in color. To get pictures in color, a color receiver will be necessary.

"Under this system, using one tube at the camera and one at the receiver, we expect to prove the worthiness of our process as compared to other systems submitted to the FCC," Mr. Matthews stated.

Science News Letter, February 25, 1950

NUCLEAR PHYSICS

Glass Cows Produce Milk Too Hot to Handle

➤ GLASS "cows" producing radioactive "milk" too "hot" to handle except by remote control have been unwrapped from the secrecy of atomic bomb research.

The Brookhaven National Laboratory device was nicknamed a glass "cow" because it resembles an udder. It provides a method of stopping a rotating funnel at the right place and time to discharge radioactive fluids into the proper outlet.

L. G. Stang, Jr. and G. J. Selvin in Upton, N. Y., devised the use of solenoids to accomplish this. Solenoids are wire coils which, when an electric current is flowing through them, act as a magnet. The solenoids are placed around the outside of the flask, in positions corresponding to the outlets. The glass or plastic funnel outlet is covered with soft iron.

As many solenoids are used as there are outlets needed, each one having its own power switch.

Thus radioactive liquids can be diverted into one of several outlets by an operator located at a distance where he is safe from the harmful effects of radiation.

Science News Letter, February 25, 1950

DENTISTRY

Doodling for 4-Yr. Olds Instead of Thumb-Sucking

➤ IF the children are still thumb-suckers at the age of four, parents should teach them to doodle instead. This advice comes from a group of dentists who held a session on dentistry for children at the University of Illinois College of Dentistry, Chicago, Ill.

The doodling was suggested as a substitute for thumb and finger sucking because if these sucking habits are persisted in after age six, when the permanent incisor teeth begin to erupt, the child's bite will be seriously damaged and "buck-tooth" result. Finger sucking usually stops by the age of four years, the dentists pointed out.

Science News Letter, February 25, 1950

MEDICINE

Molecules of Blood May Detect Artery Disease

➤ "DEFECTIVE" giant molecules in the blood may give doctors a way of detecting the most serious form of hardening of the arteries before symptoms of the disease appear.

These defective molecules and their relation to the artery hardening called atherosclerosis were discovered in efforts to learn more about the effects of atom bomb and other radiation.

The findings are announced by Dr. John W. Gofman and associates of the University of California in the journal, SCIENCE (Feb. 11).

Many giant molecules carried in the blood have as one of their components the fatty chemical, cholesterol. This chemical has long been suspected of being involved in the particularly fatal artery hardening condition called atherosclerosis.

One type of cholesterol-bearing giant molecule can be present in the blood without any atherosclerosis being present, the California scientists discovered. But when certain other, apparently "defective" giant molecules with cholesterol in them are in the blood, atherosclerosis is also present.

One of the differences between the two kinds of molecules is in their content of protein. The defective ones contain little or none in contrast to the other cholesterol-bearing molecules which have a protein content of 25% by weight.

When patients were put on a diet restricted in cholesterol or fat, within two weeks to one month the number of the "defective" giant molecules was definitely reduced or even brought to such a low level that they could not be detected.

Detection of the giant molecules and distinguishing the defective ones from the non-defectives involves the use of an ultracentrifuge which spins at a rate of 60,000 revolutions per minute.

Science News Letter, February 25, 1950

ASTRONOMY

Mars Approaches Earth

The red planet and Jupiter are both visible on March evenings. An eclipse of the sun, not visible in North America, will occur on March 18.

By JAMES STOKLEY

➤ BRIGHTEST object visible in the heavens on March evenings is the star Sirius, the dog star, shining in the southwest in the constellation of Canis Major, the great dog. Nearly as brilliant is the planet Mars, which makes an approach to earth in March. Early in the evening it can be seen low in the east, in Virgo, the virgin. Its brightness and red color make it easy to locate. In the last half of March it is in opposition to the sun, i. e., it is directly opposite the sun, and rises at sunset. At that time it is within 60,360,000 miles, closer than for several years, and that is why it shines so brightly.

The accompanying maps show the arrangement of these, and other celestial bodies, as they appear around 10:00 p. m. your own kind of standard time, at the first of March, and an hour earlier around the 15th. The particular position of Mars that is shown is that which it has on the 15th of the month, but it is in the same general part of the sky all month.

Above and to the right of Mars is another planet, Saturn, which is about a fifth as bright, though still equal to most of the stars. It stands in the constellation of Leo, the lion.

Visible Stars

Among the other stars to be seen these evenings, Capella, in Auriga, the charioteer, comes second in brilliance to Sirius. It appears high in the northwestern sky. Between Capella and Sirius are a number of bright stars, including those in the constellation of Orion, the warrior, which can be recognized by the three stars in a row that mark his belt. Betelgeuse is the bright star above the belt, while Rigel is below. To the right of Betelgeuse is Taurus, the bull, with Aldebaran, another star of the first magnitude.

Toward the south, above the great dog, is the smaller, Canis Minor, also marked by an orb of the first magnitude, Procyon. And above this figure we find Gemini, the twins, with Castor and Pollux, the latter being the brighter of the pair. In the southeast, above and to the right of Saturn, and the brightest star in the lion, Regulus can be located. It marks the end of the handle of a smaller group called the sickle. Virgo, the group in which Mars is now standing, also contains a first magnitude star—Spica. But it is so near the horizon, at the times for which the maps are drawn, that its light is considerably dimmed by the great thickness of atmosphere through which it has to pass. As Spica climbs higher, later at night, its brilliance is increased.

Mercury, nearest of all the planets to the sun, cannot be seen at all in March. However, two other planets are morning stars, shining low in the east just before the sun rises. One is Venus, most brilliant of all, which exceeds Mars by about 40 times. The other is Jupiter, which comes up after Venus, and is a little brighter than Mars.

Direction of Planets

All the planets, like the earth, revolve about the sun. Venus and Mercury move in orbits that are smaller than ours, so they can never come into opposition with the sun. The outer planets—Mars, Jupiter and Saturn, as well as the others which cannot be seen with the naked eye, Uranus, Neptune and Pluto—swing all around the sky. Sometimes they are in the same direction as the sun. Then, by their own movement, combined with that of the earth, they can travel to the opposite direction, to the position known as opposition. When in the same direction as the sun their distance from us is equal to the sum of their own distance from the sun and that of the earth, about 93,000,000 miles. At opposition, on the other hand, they are closest. Then, to find how far they are from earth, you subtract 93,000,000 miles from their distance from the sun.

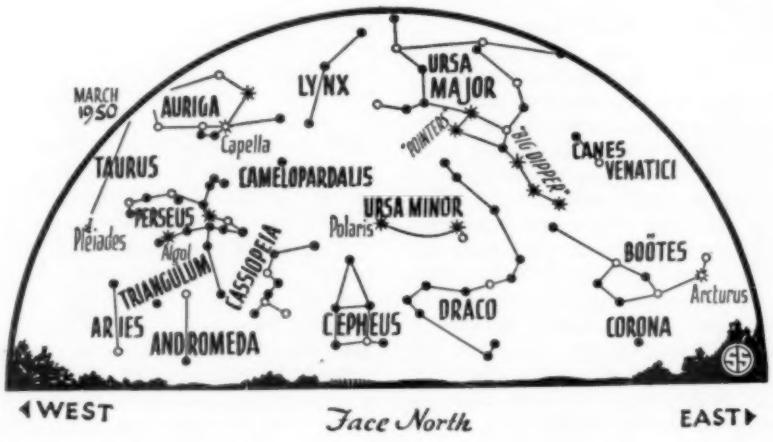
The orbit of the earth is nearly circular, varying only about 3,000,000 miles from the mean. Jupiter's orbit, likewise, is not far from a circle, as its distance from the sun varies some 23,000,000 miles from its mean 483,900,000 miles. Saturn's orbit is more elliptical, with a variation in solar distance of nearly 50,000,000 miles either side of its mean value of 887,100,000 miles. If an opposition happens to occur at the greatest distance, it may be more than a billion miles from us, though an opposition while closest the sun may bring it to within less than 750,000,000 miles. Saturn is in opposition on March 7, and quite close, only 778,500,000 miles away.

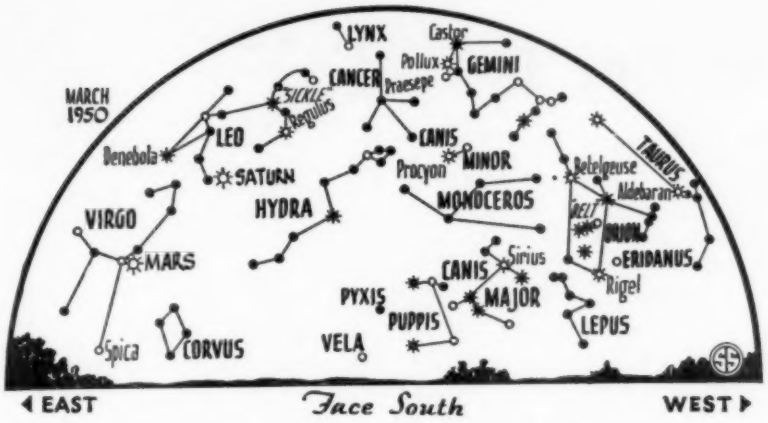
Clue to Martian Canals

Mars, likewise, undergoes a great change in distance from the sun. Its orbit is more elliptical even than Saturn. Though its average distance from the sun is somewhat more than 50% greater than that of the earth, or 141,690,000 miles, it varies about 13,000,000 miles from this figure. Mars is nearest the sun when in the same direction that the earth is on Aug. 28. Consequently an opposition at that date would bring it to within about 35,000,000 miles, while one around the first of March would find it 63,000,000 miles away, as it was at the last approach before this March, on Feb. 18, 1948.

The planet reaches opposition every two years two months, approximately. The poorest opposition is now past, and future ones will improve. That of May 2, 1952, will be 52,400,000 miles and its successor on June 25, 1955, will shorten the distance to 40,300,000 miles. The closest approach since 1924 will arrive on Sept. 11, 1956, when it will be only 35,400,000 miles away. On that occasion the great 200-inch Hale telescope at Mt. Palomar in California, and other great instruments recently built or now under construction, will surely be aimed at it, to find new knowledge concerning this mysterious planet. Perhaps they will even settle the problem of the Martian "canals," those curious markings which some have thought indicative of the presence on Mars of an intelligent race of beings.

An eclipse of the sun occurs on March 18, but is not visible in North America. Moreover, there is very little settled land





✲ ✷ ○ ● SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

where it will be possible to observe it. This is an annular eclipse, one in which the distance of the moon is such that even though it passes in front of the sun, it appears smaller than that body, and does not completely cover it. Around the dark disk of the moon, even where the eclipse is seen best, there remains a ring, or annulus, of the solar disk.

Annular Eclipse of Sun

Ordinarily, at such an annular eclipse, there is a path on the earth along which the moon can be seen exactly in line with the center of the sun, but this month that part of the path is off the earth entirely. However, calculations show that over a small area of the South Atlantic Ocean, between South Africa and Antarctica, a somewhat off-center annular eclipse will appear, if anyone is there to see it. A partial eclipse, with the moon only partly covering the sun, will be observable over a greater area, though this, too, is mostly over the South Atlantic, between South Africa and South America. A small partial eclipse will be visible from the southern tip of South America and from South Africa, where it will occur as the sun is setting.

Time Table For March

March	EST	
2	8:14 p. m.	Algol (variabe star in the constellation of Perseus) at minimum
4	5:34 a. m.	Full moon
	10:41 a. m.	Moon passes Saturn
5	5:03 p. m.	Algol at minimum
6	12:36 a. m.	Moon passes Mars
	8:00 a. m.	Moon nearest, distance 225,400 miles
	3:00 p. m.	Venus at greatest brilliance
	12:00 p. m.	Saturn nearest, distance 778,500,000 miles
10	9:38 p. m.	Moon in last quarter
14	12:57 p. m.	Moon passes Venus
15	3:05 p. m.	Moon passes Jupiter
18	10:20 a. m.	New moon; annular eclipse of sun, visible in South Atlantic Ocean
20	11:36 p. m.	Sun crosses equator, vernal equinox, beginning of spring in northern hemisphere and of autumn in southern hemisphere
22	6:00 a. m.	Moon farthest, distance 252,100 miles
	9:59 p. m.	Algol at minimum
25	6:48 p. m.	Algol at minimum
26	3:09 p. m.	Moon in first quarter
27	1:00 a. m.	Mars nearest, distance 60,360,000 miles
31	5:55 p. m.	Moon passes Saturn

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, February 25, 1950

ENGINEERING

Safe Cable for Outdoor Neon Signs Now Available

➤ SAFE high-voltage cable for outdoor neon signs, recently developed with insulation made of polyethylene and chlorine compounds, was recommended to the American Institute of Electrical Engineers by L. F. Roehmann and E. W. Greenfield of the Anaconda Wire and Cable Company, Hastings-on-the-Hudson, N. Y. Decreased maintenance is an important result.

The new cable is safe in operation, is unaffected by moisture, contamination and salt deposits at the ends, requires no special knowledge or skill to handle, and will meet specifications relative to flame-resistance, they said.

The development of this cable will mean a great saving in maintenance cost of neon light signs. Some 10,000,000 feet of various types of cable were required last year in the United States for luminous signs. And despite the fact that cable used for neon signs is high-voltage, installation techniques usually follow accepted practice of low-voltage wiring, they declared.

Conclusions of tests reported by these engineers were: rubber-and-friction tape splices are not permissible in exposed sign cables; because sign cable runs are short, only continuous lengths should be used; and all-plastic insulated cables are adequate even under severe operating conditions provided the ends are properly protected.

Science News Letter, February 25, 1950

ENGINEERING

Cold Weather Starting Easier with New Heater

➤ EASY cold-weather starting of internal combustion engines, of the types used in automobiles, airplanes and particularly diesels, is promised by an Italian inventor who received an American patent for a device that utilizes an electric heater to raise to a high temperature the air employed in combustion.

The inventor is Gianni Lancia, Turin, Italy. Patent 2,485,750 was awarded to him by the U. S. Patent Office. His heating device is attachable to any make of engine of the internal combustion type.

Within his attachable unit is a block of refractory material with passages through which wire of high electric resistance is placed. When connected to an electric supply source, high heat results. After the heating unit is raised to a high temperature, the engine crankshaft is rotated by self-starter or otherwise and hot air is drawn through the heater into the engine to mix with the fuel to give a mixture that is easily ignited.

Science News Letter, February 25, 1950

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VETERINARY MEDICINE

Drugs Fight Cow Disease

➤ THE battle against mastitis, the udder infection of dairy cattle that puts a serious crimp in the annual milk output, is slowly being won.

The weapons that insure that this costly ailment will in the near future be reduced to economic unimportance are the antibiotic drugs, penicillin, aureomycin and streptomycin, coupled with the wider spread of hygienic practices.

This prediction was made by a visiting British veterinary expert, Dr. Samuel J. Edwards, a senior member of the Agricultural Research Council's field station at Compton, in Berkshire, England. Dr. Edwards is winding up a three-month study of American dairying under the auspices of the Economic Cooperation Administration.

What is needed to eliminate mastitis once and for all, both in this country and in Great Britain, said Dr. Edwards, is to get all dairy farmers to apply routinely the knowledge of how the disease spreads.

Specifically, he said, this refers to the practice of "hand stripping", that is the custom of hand milking the last drop of milk after the cow has been machine milked. Because the hand can not be disinfected as thoroughly or as dependably as the machine, hand stripping results in the spread of the disease from one cow to another.

On the other hand, exclusive use of milking machines plus a scrupulous disinfection of the machine before and after each cow, cuts down the threat of transmission to a minimum. Machines are used in over 95% of all large herds in Britain, he said, and the percentage is similarly high in the United States.

"I was much impressed with the fact that students in this country have a splendid opportunity to see dairy management of the first class at the state agricultural colleges," Dr. Edwards said. His tour of the United States has taken him to the leading agricultural colleges in the East, Midwest and California, as well as Government experiment stations, and the National Live Stock Exposition at Chicago.

Dr. Edwards, a fellow of the Royal College of Veterinarians, has been making his mastitis study under an ECA technical assistance project.

Science News Letter, February 25, 1950

ASTRONOMY

Icarus Is New Asteroid

➤ ICARUS is the name given to the minor planet or asteroid that travels closer to the sun than any other known in the solar system.

Discovered last year by Dr. Walter Baade, Mt. Wilson Observatory astronomer, this unusual member of the sun's family was known as number 1566 or 1949 MA until it was christened after the mythological boy whose wings of wax were melted by a flight too close to the sun.

The new name was announced by Dr. Paul Herget of Cincinnati University Observatory, world center for minor planet information.

Icarus approaches within 17,000,000 miles of the sun in an elongated, football-shaped path. Believed to be only about nine-tenths of a mile in diameter, it takes only 409 days to complete one journey around the sun.

At one end of this journey along its elliptical path around the sun, Icarus is out beyond the orbit of Mars, at a distance of 180,000,000 miles from the sun. When it is at its nearest approach to the sun it is within the orbit of the planet, Mercury.

Because its path does bring it so close to Mercury, astronomers will be able to determine accurately the mass of Mercury, which is still relatively uncertain.

Icarus is too faint to be seen at any time by the naked eye. At the present time, the asteroid can not be seen from the surface of the earth. Astronomers expect to be able to train their telescopes on the object again late this spring.

The asteroid is estimated to have a temperature as high as 1,000 degrees Fahrenheit when it is closest to the sun. At its greatest distance from the sun six months later, however, the surface is well below the freezing point of water.

Icarus, the mythical boy for whom the asteroid is named, escaped imprisonment on wings made for him by his father Daedelus. They were fastened to his back with wax. So enchanted with flying did Icarus become that he kept going higher and higher until finally the sun melted his wings, and then he dropped into the sea.

Science News Letter, February 25, 1950

AERONAUTICS

Turbo-Prop Air Transport Ready for Flight by June

➤ A FORERUNNER of long-range air transports of the future, a turbo-prop Convair-Liner under construction by Consolidated Vultee in San Diego, Calif., will be ready for flight in June, it has been revealed. It will be America's first turbo-prop transport.

The turbo-prop utilizes an engine similar to that used in jet propulsion but the high-pressure gas created in the gas turbine operates a shaft to which conventional propellers are attached. Speed and economy are the expected results. A speed approaching 500 miles an hour is possible. A saving of approximately 2,000 pounds in engine weight means ability to carry a greater payload.

This new Convair, almost identical with the 40-passenger Convairs now long in service except for the power plant, will be equipped with two of the new Allison T-38 twin turbo-prop engines. Old Convairs can be easily fitted with the new engines. The engine is said to be the most powerful propeller-type engine ever cleared for flight. It develops two horsepower per pound of weight.

Turbo-prop planes have a permanent place in the future, LaMotte T. Cohu, president of Convair, recently declared. They are the logical step in airline progress because the vast public investment in airports, airways and traffic control systems is geared to propeller-driven planes. The new planes will fit neatly into today's traffic pattern because fuel economy is such that planes can carry ample reserves to meet government requirements.

In addition to operating at materially higher cruising speeds, the new Convair liner will provide greater passenger comfort. Noise and vibration of the ordinary piston-powered engines are eliminated. Practical elimination of vibration means lower maintenance costs.

Science News Letter, February 25, 1950

CHEMISTRY

Never Change Car Oil From Fluorine Compounds

➤ FLUORINE compounds that will result in automobile oil and lubricants that will never need changing were predicted at the American Chemical Society meeting in New York by Prof. Earl T. McBee of Purdue University.

Tremendous progress in the study of fluorine chemistry has been made in the few years since the unruly element was pressed into service in the atomic bomb project, he said. Fluorocarbons, compounds of fluorine and carbon, have received special attention. They have proved valuable in insecticides, anesthetics, plastics and many other fields.

With the rapidly increasing knowledge of fluorine chemistry, the production of exceptionally stable coolants, lubricants, hydraulic fluid, and lubricant additives is to be expected. It may become practical in the near future, Prof. McBee added, to produce automobiles in which the engine oil and other lubricants need not be changed and will require only infrequent inspection.

Science News Letter, February 25, 1950

BIOCHEMISTRY

Single Cell Analysis?

➤ IT may not be long before scientists are accurately analyzing the chemistry of single cells, and this will mark a revolutionary development in science.

Already, largely through the efforts of Dr. Paul Kirk, professor of biochemistry at the University of California, it is possible to measure quantities that hardly outweigh a whisper.

Right now, Dr. Kirk, a pioneer of ultramicrochemistry, can weigh invisible quantities as small as a few billionths of a gram. It takes about 28 grams to make an ounce.

It will take instruments of about 100 times the sensitivity of present ones to pry into the biochemistry of single cells. Dr. Kirk is now working on such instruments, and, while there are problems, he sees none that are insurmountable.

Interpretations of biological phenomena in terms of single cells will bring greater understanding of life processes, he points out, for it is much easier to understand the biochemistry of a single cell than of a whole animal

Furthermore, there is no loss in accuracy with ultra-microchemical techniques for a great many purposes. Nor are these techniques more difficult to teach.

One of Dr. Kirk's Tom Thumb laboratories occupies hardly more than an ordinary table, and contains most of the paraphernalia of a large laboratory, though on a much reduced scale.

Dr. Kirk's conclusions are stated in a new book of his. QUANTITATIVE ULTRAMICROANALYSIS (*Wiley*).

He writes: "In the field of biology, an understanding of the chemistry of the cell is the next great frontier to be conquered. Without chemical methods applicable to the study and analysis of single cells, there will remain a constant challenge to the analytical explorer.

"It can be stated dogmatically that there are no insurmountable problems to prevent the ultimate chemical analysis of single cells. Much investigation remains before this goal can be achieved, but achieved it will be, and probably along the lines already partly explored and indicated by past investigations."

Science News Letter, February 25, 1950

ENGINEERING

Panels for Radiant Heat Best Placed in Ceiling

➤ THE best place to put panels for radiant heating of a room is in the ceiling, not the floor, the American Society of Heating and Ventilating Engineers was told in Dallas, Texas, by L. P. Herrington and R. J. Lorenzi of the John B. Pierce Foundation, New Haven, Conn.

In this relatively new method of home heating, which seems to be rapidly growing in popularity and is the subject of wide-spread scientific investigations, hot water or steam pipes are embedded in floor, ceiling or sidewalls. Panels in which they are embedded become warm and transmit heat into the room by radiation.

The conclusions of the New Haven scientists come from studies recently made. Human beings were used for "guinea pigs." The purpose was to find what effect the location of the radiant heating panel had on the human body.

Since room temperature is closely related to the surface temperature of an occupant's skin and clothing, measurements were taken of the head temperatures, exposed skin temperatures, and clothing surface temperatures of the men used in the tests. Then, mean comfort votes and mean temperature votes were taken.

One of the primary conditions of thermal comfort, these investigators stated, is a skin temperature ranging from approximately 80 degrees Fahrenheit on the toes and sole of the foot to approximately 95 degrees on the trunk and certain facial areas, with an overall average for the skin surface of about 90 degrees. Physiological considerations, they said, support the view that floor temperatures above 75 degrees are not desirable.

Science News Letter, February 25, 1950

ENGINEERING

Smokeless Powder Is Made More Cheaply and Quickly

➤ SMOKELESS powder for big guns can be made more cheaply and quicker, thanks to a development of the U. S. Department of Agriculture's Southern Regional Research Laboratory.

It is a matter of a better method of taking sulfuric acid out of the finished nitrocellulose or gun cotton. The explosive for our large army and navy guns is made by nitrating the short fibers left on cottonseed after ordinary ginning of cotton—cotton linters they are called. Nitric acid does the job, but sulfuric is used to help along the process. It must be washed and boiled out, otherwise the finished powder will be unstable and decompose when stored for the next war.

The new process which takes less space, fuel and time was worked out by Richard E. Reeves and other governmental scientists.

Science News Letter, February 25, 1950

Words in Science—PSYCHOLOGY-PSYCHIATRY

➤ WHAT we know about the mind and how it works, what we have learned about its development from birth to death and from man's beginnings—all that comes under the science of psychology. Psychology, as we know it today, began its development in the 19th century and psychologists say that they still have a long way to go before they know very much about the mind. The psychologist is concerned with the normal mind.

But the psychiatrist is concerned with minds that stray from the normal. He learns a great deal of what the psychologist knows and then applies it in the treatment of persons whose minds are sick.

Science News Letter, February 25, 1950

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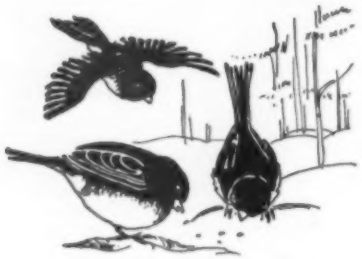

Junco

➤ JUNCO sounds like the name of one of the newer international organizations affiliated with the United Nations. It is not, but it would not be inappropriate if it were.

For the slate-colored junco, or snow bird, is an international creature which in its own person is a fitting symbol of the amity that exists on both sides of the American-Canadian border which it flits across as the whims of the season dictate.

Juncos are small birds, somewhat resembling sparrows. In fact sparrows and juncos belong to the same family of birds, the fringillidae. The junco can be distinguished by its dark slate-gray color, marked with white on the abdomen and white outer tail feathers. The bill is whitish or pinkish, contrasting with the dark head.

The junco spends its summers in the north, breeding in a broad belt extending from Alaska to Labrador down to a line just south of the Canadian border. In winter it moves south, and is found from New England to the Gulf of Mexico.

The name snowbird has been applied to the junco, apparently because it is one of the few birds that are seen when snow is on the ground. It feeds on weed seeds for the most part, and is frequently to be seen in weed patches which stand above the snow level.

Although the junco moves generally southward to escape the biting severity of the northern winter, it is an extremely hardy bird. One ornithologist captured some juncos and instead of letting them migrate south, he kept them in open aviaries throughout a Canadian winter.

He supplied them with food which they would have had difficulty finding on their own. The temperatures dropped as low as 52 degrees below zero and rarely rose above zero at any time. Nonetheless, the birds survived. The birds did seem to fatigue quickly and on one occasion during a blizzard their feet became encased in ice. They suffered no visible ill effects from this.

These were artificial conditions, of course. Left to their own devices the juncos would have lit out for less arduous climes long before the first blizzard struck. And if in their wintering ground, the weather should become too blustery, juncos know enough to take cover and not stand around till they become icebound.

According to Audubon, the great early American authority on birds, juncos burrow into haystacks when they sense an approaching storm. They must seek shelter of some sort, because they do survive, and each year they flit back and forth across the border in vast numbers.

Science News Letter, February 25, 1950

PHYSICS

Heated Polonium Shrinks

➤ DISCOVERY of the first metallic element yet known that shrinks instead of expanding when heated has been made as a by-product of the atomic bomb.

The metal element is the highly radioactive polonium. This metal looks a lot like lead and resembles lead in its physical properties, Dr. Charles R. Maxwell, Dr. William H. Beamer and William E. Easton of the Atomic Energy Commission's Scientific Laboratory in Los Alamos, N. Mex., have found. They were investigating the physical properties of polonium for the first time.

Heretofore this metal, discovered by Madame Curie in 1898, has been available in such minute quantities that no measurements could be made of its physical properties. With the larger though still very small amounts available from the Manhattan Project during the war, these scientists investigated the physical properties of polonium.

For the first time in a pure element they observed simple cubic crystal structure. The cubic structure is a basic crystal structure, yet has never before been observed in an element. There is no theoretical explanation yet to explain the cubic crystal form in polonium.

Polonium is often used in extremely small quantities to paint the figures on luminous watch dials. It is named in honor of Madame Curie's native country, Poland.

Lead is the element into which polonium decomposes when it shoots off alpha rays. Alpha rays, the most easily absorbed of all radioactive radiations, are actually the hearts, or nuclei of helium atoms.

Besides investigating the way that one form of the metal reacts when heated and the cubic crystal structure, the scientists also found that polonium melts at 590 degrees Fahrenheit and has a density of 9.4 grams per cubic centimeter. That means that polonium weighs 9.4 times as much as the same volume of water.

Gauge of the radiation activity of an element is by means of its so-called half-life. This is the length of time required for half the radioactivity originally present to be shot out from the material. Polonium has a half life of 138.3 days.

Science News Letter, February 25, 1950

METEOROLOGY

Gaps in Upper Air Weather Information Need Filling

➤ EXISTING gaps in the world network of upper air weather reporting are causing worry to the International Civil Aviation Organization in Montreal. Serious attempts are now to be made to fill the gaps.

Modern airliners are now flying on scheduled routes through the upper atmosphere, 10,000 to 30,000 feet above sea level. North America and Western Europe are obtaining the information pilots need, but other parts of the world are not.

These upper air weather conditions are obtained with radiosonde balloons. They are unmanned balloons that carry recording-reporting weather instruments whose readings by radio automatically reach the earth constantly. The major difficulty in extending the network is financial. It costs about $30,000 a year to maintain a single radiosonde station.

Science News Letter, February 25, 1950

WILDLIFE

Watch the Birds that Pass: A Duck May Hide a Bass

➤ HERE'S a tip for anglers. If you aim your cast a little to starboard of a feeding duck, you may get a lucky strike from a largemouth bass.

It seems the bass are a shrewd lot and they are in the habit of freeloading on the underwater delicacies stirred up by the duck as it cuts through the water looking for its own lunch.

Close observation of this kind of collaboration between the larger fish and certain swimming animals has convinced Dr. Frederick S. Barkalow, Jr., zoology professor at North Carolina State College of Agriculture and Engineering in Raleigh, N. C., that the fish take advantage of the stir caused by the other's swimming activity.

Trout as well as bass attach themselves in this way to surface swimmers, he believes. In a communication to the JOURNAL OF WILDLIFE MANAGEMENT (Jan.), he notes that other swimmers on whom the fish poach are beaver and swamp rabbit.

Science News Letter, February 25, 1950

• Books of the Week •

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ABC's OF PHOTOGRAMMETRY PART I: FUNDAMENTALS—*Gomer T. McNeil,* approx. 125 p., illus., $3.00. Presents basic concepts in the field. For the junior photogrammetrist and specialists in related subjects. A prerequisite to Part II.

ABC's OF PHOTOGRAMMETRY PART II: TILT AND CONTROL EXTENSION—*Ralph O. Anderson,* approx. 145 p., illus., $3.00. Discusses the operational procedures required in the course of recovering survey data from photographic measurements. Supplementary to Part I ABC's of Photogrammetry.

THE AGRICULTURAL ESTIMATING AND REPORTING SERVICES OF THE UNITED STATES DEPARTMENT OF AGRICULTURE—Bureau of Agricultural Economics and Production and Marketing Administration—*Gov't. Printing Office,* U. S. Dept. Ag. Misc. Publ. No. 703, 266 p., illus., paper, $1.00. History, organization, and methods of this service are given.

BIOLOGICAL ACTIONS OF SEX HORMONES—Harold Burrows—*Cambridge University Press,* 2nd ed., 615 p., illus., $8.50. A co-ordinated summary of experimental investigations brought completely up-to-date.

BRAZILIAN CULTURE: An Introduction to the Study of Culture in Brazil—Fernando de Azevedo—*Macmillan,* 562 p., illus., $12.50. A description of the country and its people, their work, the growth of their cities, and social and political evolutions. Translated from the Portuguese by William Rex Crawford.

CASE HISTORIES OF SUCCESSFUL ADVERTISING: Problems—Solutions—Results—Printers' Ink Editors and Contributors—*Funk and Wagnalls* in association with *Printers' Ink,* 296 p., illus., $4.75. Outstandingly successful examples of advertising and marketing in many different fields.

CONSUMPTION OF FEED BY LIVESTOCK 1909-47: Relation Between Feed, Livestock, and Food at the National Level—R. D. Jennings—*Gov't. Printing Office,* U. S. Dept. Ag. Circ. No. 836, 105 p., illus., paper, 25 cents.

DIMENSION STOCK AND OTHER USES OF ASPEN—Alexis J. Panshin—*U. S. Department of Agriculture,* Lake States Aspen Report No. 12, 18 p., paper, free upon request to publisher, Lake States Forest Experiment Station, St. Paul 1, Minn. A brief report on the properties of aspen.

ELEMENTS OF CALCULUS—Thurman S. Peterson—*Harper,* 369 p., illus., $3.50. An introductory college text.

ENJOYING LEISURE TIME—William C. Menninger—*Science Research Associates,* Life Adjustment Series, 48 p., illus., paper, 60 cents. Suggests methods for using leisure time constructively. For teenagers, parents and those working in the guidance field.

GOALS FOR AMERICAN EDUCATION—Lyman Bryson, Louis Finkelstein, R. M. MacIver, eds.—*Harper,* 555 p., $5.00. This volume grew out of the Ninth Symposium on Science, Philosophy and Religion in their Relation to the Democratic Way of Life. Stresses the purposes of American education.

JANE'S FIGHTING SHIPS 1949-50—Francis E. McMurtrie and Raymond V. B. Blackman, eds.—*McGraw-Hill,* 416 p., illus., $16.50. An encyclopedia of the navies of the world.

JET PROPULSION—H. G. WINTERSTEEN—*International,* 64 p., illus., paper, $1.00. Explanation for the layman of the basic fundamentals of jet propulsion.

MEN'S PREFERENCES AMONG SELECTED CLOTHING ITEMS—U. S. Department of Agriculture—*Gov't. Printing Office,* 191 p., illus., paper, 40 cents. A study of the preferences of men 16 years old and over in some of their most important clothing purchases.

METHODS FOR MICROBIOLOGICAL AND CHEMICAL DETERMINATIONS OF ESSENTIAL AMINO ACIDS IN PROTEINS AND FOODS—Millard J. Horn, D. Breese Jones, and Amos E. Blum—*Gov't. Printing Office,* U. S. Dept. of Ag. Misc. Publ. No. 696, 12 p., illus., paper, 10 cents.

NASHUA GUMMED AND COATED PAPER COMPANY AND SEVEN AFL UNIONS: A Case Study—Charles A. Myers and George P. Shultz—*National Planning Association,* 89 p., illus., paper, $1.00. A report of a study of both the management and the union leadership.

THE NATURE OF MAN: His World—His Spiritual Resources—His Destiny—A. William Loos, Ed.—*The Church Press Union,* 110 p., $1.00. An attempt to show how science, philosophy, and religion contribute to an understanding of the nature of man. Articles are written by such leading scientists as Edmund W. Sinnott, Kirtley Mather, and Gardner Murphy.

NEW SUBSPECIES OF BIRDS FROM SOUTHWESTERN ASIA—Walter Koelz—*American Museum of Natural History,* 10 p., paper, 25 cents. Report of the new subspecies found by the author while collecting in Iran, Afghanistan and India.

A NEW SURVEY OF SCIENCE: A Revised and Enlarged Edition of "Science Marches On"—Walter Shephard—*Harcourt, Brace,* 511 p., illus., $4.75. Presents a brief picture of major scientific developments beginning with man's first concept of number up to and including the principles of the atomic pile.

NOTES ON BIRDS OF SOUTHEASTERN PAPUA—E. Thomas Gilliard—*American Museum of Natural History,* 40 p., paper, 25 cents. A report based on the collections of the author.

SOME EARLY TOOLS OF AMERICAN SCIENCE: An Account of the Early Scientific Instruments and Mineralogical and Biological Collections in Harvard University—I. Bernard Cohen—*Harvard University Press,* 201 p., illus., $4.75. A description of early scientific instruments used at Harvard during its early days. Well illustrated.

STUDIES OF SOUTH AMERICAN PLANTS, XII—A. C. Smith—*Gov't. Printing Office,* Smithsonian Institution's Contribution From The United States National Herbarium, Vol. 29, Part 8, approx. 76 p., paper, 35 cents. Brings together miscellaneous notes on South American representatives of special families of phanerogams.

Science News Letter, February 25, 1950

PLANT PATHOLOGY

Mistletoe Choking Forests

➤ THERE is a strangler loose in the nation's forests that is choking trees to death. The fatal grip is a toe-hold—a mistletoe-hold.

Dwarf mistletoe is a tree parasite that is causing forest pathologists of the U. S. Department of Agriculture grave concern. In Grand Canyon National Park and in Kaibab National Forest, foresters report that the tiny mistletoe plant has invaded on a serious scale.

There is danger that the vast acreage of government and private pine forests in the West may be destroyed by the mistletoe, which kills the host trees by slow strangulation, or reduces the value of cull timber by producing scrawny trees.

The leafless little killer has one characteristic which may be its undoing, the scientists think. Dwarf mistletoe spreads its seeds by an explosion of the seed sack. Seed travels as much as 60 feet, usually to stick onto another tree. The new host then is saddled with the unwanted parasite.

Using this knowledge, foresters are now systematically hunting down areas of mistletoe infestation, and clearing out any mistletoe found in a 60-foot wide circle around the suspected area.

They think that by repeating this methodical cleanup two or three times at two-year intervals, they can break the strangling mistletoe-hold.

Science News Letter, February 25, 1950

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HOME HAIR TRIMMER, electrically operated, has two full sets of keen, hardened steel cutters, one on each side of the double-headed affair. Each set of cutters are at a different approach angle which makes it suitable for varied uses.

Science News Letter, February 25, 1950

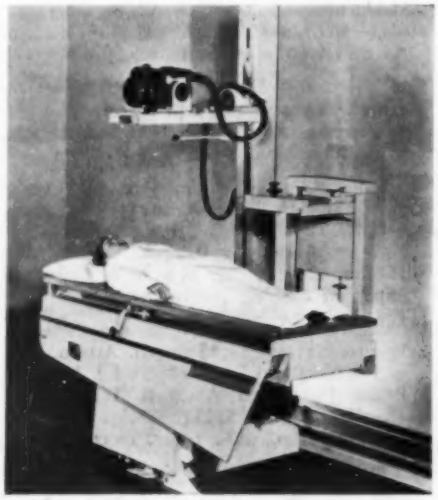
PROFESSIONAL TOOL for cleaning all internal parts of an automobile's carburetor without removal from the engine is attached to the carburetor fuel intake and injects a special chemical solution and gasoline into it while the engine is running. The solution removes all deposits in 15 minutes.

Science News Letter, February 25, 1950

LIGHTNING ARRESTER for the television set, to prevent damage from lightning or static charges collecting on the roof antenna, is a porcelain affair that can be installed on the mast or on a grounded pipe. Discharge contacts are sealed in rare gas to dissipate the charges that may cause damage.

Science News Letter, February 25, 1950

"STEPPING STONE" line of X-ray equipment can be constructed into more than 300 types and models. It will permit small hospitals to up-grade their X-ray facilities one step at a time as funds become available. The picture shows a fully equipped model for use in large institutions.



Science News Letter, February 25, 1950

PLANT MUTATION KIT, for amateur experimenters in changing the characteristics of plants with colchicine, comes complete with this deadly poisonous chemical in solution and paste form, watch glasses, filter papers, vials and tweezers. A direction booklet in non-technical terms is part of the kit.

Science News Letter, February 25, 1950

COIN BOX, which forms a convenient handle to a new transparent plastic umbrella, will hold 50 cents or more in pennies, nickels and dimes where the coins are readily available for streetcar fare. Coins are removed through slots on the side.

Science News Letter, February 25, 1950

BATHING AID, for use with infants in a bathtub, is an inclined strip of ducking held by a metal frame on which the baby may sit or lie. Its shape makes a comfortable seat when the lower end of the cloth is dropped. A strap on this recently patented device holds the infant in the desired position.

Science News Letter, February 25, 1950

SOIL MOISTURE is measured with a device which includes a book-size block to bury in the ground from which wires lead to an overground electrical resistance meter. The block, made of thin metal plates separated by nylon, and assembled under pressure, absorbs moisture in exact proportion to the soil moisture.

Science News Letter, February 25, 1950

Do You Know?

India's production of *tea* is over a half billion pounds a year.

Roots and *herbs* were used for their curative effects probably among men of all primitive races.

The first *metals* used by early man were those that exist in uncombined form, such as gold, silver and copper.

Aluminum is protected from burning in the air like magnesium by an oxide coat that forms on it when burning is tried.

A new *wind tunnel* used in England in aviation developments uses a standard British turbo-jet engine to provide the air flow.

New direct *radiotelephone circuits* from the United States to Hong Kong and the Union of South Africa were introduced during 1949.

Petroleum is of course important as a fuel for engines but is equally important as a source of lubricants without which engines could not operate.

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